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Journal of the Society of Arts.

FRIDAY, MAY 14, 1858.

CONVERSAZIONE.

The second Conversazione of the present session was held at the South Kensington Museum, on Saturday evening, the 8th inst.

The following divisions of the Museum were open on this occasion :—

1. The Sheepshanks Gallery of Pictures.
2. The Sculpture Gallery.
3. The Architectural Museum.
4. The Animal Produce Collections.
5. The Ornamental Art Collections.
6. The Structure and Building Materials Collections.
7. The Educational Collections.
8. The Collection of Patented Inventions (by permission of the Commissioners of Patents).
9. The Photographic Society's Exhibition (by permission of the Council of the Photographic Society).
10. The Art Training Schools.

The following objects were exhibited to the public for the first time :—

1. A Model, showing the Campaign before Sebastopol, executed by Col. Hamilton, C.B., Grenadier Guards, at the suggestion of his Royal Highness the Prince Consort, for the United Service Institution.
2. Statue of Venus, by J. Gibson, R.A., and the picture of the "Duchess of Burgundy distributing Alms," by Leys (the celebrated Belgian artist), kindly sent by Matthew Uzielli, Esq., a member of the Society.

The guests were received on entering by the Council of the Society.

The band of the 1st Life Guards attended.

The number of members and their friends present amounted to 2,280.

The Council desire to express the thanks of the Society to "A Friend of the Society," who, without stating his name, has kindly defrayed the expenses of the attendance of the Band of the 1st Life Guards at the Conversazione on Saturday last.

LOCAL BOARDS—PREVIOUS EXAMINATION.

Fifty-four Local Boards have been formed. Returns of the Candidates who have passed the Previous Examination have been received, as follows :—

Louth	4
Wigan	6
West Hartlepool.....	3
Leeds (Christian Institute), No. 1.	14
Northowram	1
Portsmouth	2
Warminster.....	1
Banbury	2
Macclesfield.....	29
Newcastle-on-Tyne	3
Lymington	1
West Brompton	4
Leeds, No. 2.	10
Wakefield	4

Pembroke Dock	4
Ipswich	6
London Mechanics' Institution.....	8
Manchester Mechanics' Institution	32
Setby	9
Bradford	18
Halifax, No. 1.	15
Salisbury	1
Liverpool	35
Lockwood	1
Halifax (Working Men's College), No. 2.	21
York	7
Berkhamstead	19
Bristol	11
London Domestic Mission	1
Royal Polytechnic Institution	28
Birmingham, No. 1, (Messrs. Chance's Reading Room).....	2
Sheerness	1
Sheffield (People's College), No. 1.	15
Sheffield (Mechanics' Institution), No. 2	3
Blackburn	5
Crosby Hall (London) Evening Classes..	19
Windsor and Eton	10
Greenwich	1

The total number of Candidates who have been examined by the Local Boards, is 1,098.

EXAMINATION PRIZE FUND FOR 1858.

The following is a list of Donations up to the present date :—

T. D. Acland, Member of Council.....	£ 5	5
The Rt. Hon. C. B. Adderley, M.P.	5	0
John Ames.....	5	5
J. G. Appold, F.R.S., Auditor	10	10
John Ball	5	5
T. H. Bastard	5	0
Messrs. Chance, Brothers	10	10
R. L. Chance	5	5
Harry Chester, Vice-Pres.	10	10
J. P. Clarke	1	1
G. Clowes	10	10
Henry Cole, C.B., Vice-Pres.	1	0
H. D. Cunningham, R.N.	1	1
C. Wentworth Dilke, Vice-Pres. Chairman of Council (third donation)	10	10
Thomas Dixon	1	1
Lieut.-Col. F. Eardley Wilmot, R.A.	5	0
Viscount Ebrington, M.P.	5	0
Lord Ebury	5	0
J. Griffith Frith, Member of Council	5	5
J. W. Gilbert, F.R.S., Treasurer (second donation).....	10	10
F. Seymour Haden (annual)	2	2
William Hawkeworth	1	1
Edward Highton (annual)	2	2
James Holmes (annual)	1	1
The Marquis of Lansdowne, Vice-Pres.....	20	0
George Lowe, F.R.S.	1	1
The Master of the Mint, Member of Council (second donation)....	10	10
George Moffatt, M.P., Vice-Pres.	10	10
Lieut.-General Sir Charles Pasley, K.C.B.	5	0
Sir Thomas Phillips, Member of Council ...	5	5
William T. Radford.....	1	1
Charles Ratcliff, Hon. Local Sec. (annual)...	10	10
Joseph Skey, M.D.	1	0
William Tooke, F.R.S., Vice-Pres.....	10	10
Arthur Trevelyan	1	0
T. Twining, jun., Vice-Pres.	10	10
Dr. J. Forbes Watson	1	1
G. F. Wilson, F.R.S., Member of Council (third donation).....	10	10

EXAMINATIONS.—PRIZES FOR 1858.

The following Prizes are offered to the Candidates, viz. :—

One First Prize of £5, and one Second Prize of £3 in each of the 26 subdivisions of the subjects of Examination.

No Prize in any subject will be awarded to a Candidate who does not obtain a Certificate of the first class therein.

The Prizes will be given in money or in books, at the option of the Candidate.

The following Prizes are offered to the Local Boards, viz. :—

To the Local Board whose Candidates obtaining Certificates of the first class (not fewer than ten) bear the largest proportion to its whole number of Candidates. —One Prize of £10.

To the Local Board whose Candidates obtaining Certificates of the first class (not fewer than eight) bear the largest proportion to its whole number of Candidates. —One Prize of £8.

To the Local Board whose Candidates obtaining Certificates of the first class (not fewer than six) bear the largest proportion to its whole number of Candidates. —One Prize of £6.

To the Local Board whose Candidates obtaining Certificates of the first class (not fewer than four) bear the largest proportion to its whole number of Candidates. —One Prize of £4.

No Local Board can receive more than one of these Prizes.

These sums may be applied by the Local Boards to the payment of the expenses of the Examination, or otherwise, as the Board may deem best, for the promotion of the objects for which it was instituted.

EXAMINATIONS.

The following Letter of Instructions has been issued to the Local Boards :—

Society of Arts, John-street, Adelphi, London, W.C.
12th May, 1868.

SIR,—I am directed by the Council of the Society of Arts to inform you that the papers for the ensuing Examination of Candidates for the Society's Certificates will be forwarded by post, on Friday, the 21st of May, in a parcel addressed to you at

You will have the goodness to let me know *by telegraph* on Saturday, the 22nd, in time for the despatch of duplicate papers by that evening's post, if the parcel is not duly delivered to you in the morning of that day.

The papers in each subject will reach you in a separate envelope, the seal of which is to be broken, in the presence of the assembled Candidates, at the commencement of the time appointed for that subject in the Time-table. This direction, as well as the *order* and *hours* of Examination laid down in the Time-table, must be strictly observed. It is absolutely necessary, for the proper working and ultimate success of these Examinations, that there should not be the very least suspicion as to the perfect fairness and equality with which they are conducted at all the different centres; and such suspicions can only be obviated by the *simultaneous* employment of the *same* set of papers at each centre. On this, and on the firmness and fidelity with which the members of the Local Boards discharge the simple, though somewhat onerous, duties required of them to prevent the possibility of any dishonest dealing on the part of the Candidates while under examination, the whole success of the present scheme depends.

I am, therefore, to invite your most careful attention to the "Advice to Candidates," which you will find printed at the foot of the enclosed copies of the Time-table, and to the terms of the accompanying Declaration, one of which forms will have to be filled up and returned to me, after it has been signed by at least two members of the Local Board, at the end of each meeting of the Candidates. To provide for this it will be necessary that you should immediately make arrangements with your colleagues on the Local Board, to secure the attendance of a sufficient number of them in rotation at the different periods of the Examination. The attention of your Candidates should be drawn to the Time-table now sent to you, and copies of it should be suspended in the Examination Room.

It will further be necessary that the Local Board should provide writing paper, of foolscap size, scribbling-paper for rough drafts, and blotting-paper for the use of the Candidates, who should be desired to bring their own pens and a small inkstand to the examination room, but nothing else. They should be required, on entering the examination room, to give up all books, papers, memoranda, writing-books, or loose blotting-paper, which they may have brought with them, under the penalty of immediate exclusion from the Examination if any such articles should thereafter be found in their possession. After such notice, the plea of accident or forgetfulness cannot be admitted.

The only exception to this regulation is in the case of the Candidates who take the exercises in Mechanical Drawing, and who should be allowed to bring with them a case of Mathematical Instruments.

Stationery should be supplied to each Candidate, at the rate of three sheets of foolscap, and one of scribbling-paper, for every Paper which he works, together with one sheet of blotting-paper, which should serve for the whole of the Examination. Ruled paper will be forwarded for the use of the Candidates who are to be examined in Book-keeping.

The Time-table has been drawn up to meet the general convenience of the whole number of Candidates who will meet at the different centres. If any one, among those who are examined under your superintendence, wishes to work *two* Papers which are fixed for the *same* hour, he should be strongly recommended to confine himself to *one* of them; and to bear in mind that, while one high certificate is of more value than two low ones, he will have an opportunity, next year, of being examined in the subject which he omits on the present occasion.

The Candidates should sit, in the order of their numbers, as far apart from each other as the space at your command will allow. If you cannot spread them out so as to prevent the *possibility* of communications passing between them, it will be well, when two or more papers are worked at the same time, to arrange alternately the Candidates who take different subjects.

Three hours only are allowed for each paper, except in the case of the exercises in Drawing, for which four hours may be taken.

All writing must cease at the end of the three hours, *to a moment*; and, if there is no clock in the room, it may be well to give notice to the Candidates when one and two hours have elapsed, and again when they are within ten minutes of the end of each sitting.

The Candidates should leave their answers at their seats (with the Examination papers attached to them), after having carefully filed them all together in order through the upper left-hand corner. A supply of green silk twist and some large needles should be procured for this purpose.

The papers should then be collected—those on each subject separately—and arranged in the order of the Candidates' numbers. After a separate Declaration has been filled up and signed, in reference to the papers on each subject, it should be tied up with them; and the

whole set, or sets, worked each day should be forwarded on the following morning, either by post (if the numbers are small), or by railway, in *one* parcel addressed to me at this office, with an entry on the cover stating the number and subjects of the papers which it contains. The Council would also be glad if you could conveniently transmit, by the post of the same day on which each parcel is sent off, a separate letter, to announce the despatch of such parcel, and mentioning, (1) The number of papers in each subject which it contains, and (2) Whether it has been forwarded by post or rail.

The Council regret to have to saddle you with the observance of so many minute directions, but, as it is quite impossible, in the multiplicity of particulars which a simultaneous Examination, on the scale of that now about to be held, involves, to rectify any serious mistake or omission, the responsibility of every one engaged, whether in arranging or carrying out the details, becomes great in proportion.

I am, Sir,

Your obedient Servant,
P. LE NEVE FOSTER,
SECRETARY.

TIME TABLE.

The Examinations will be held on the 24th, 25th, 26th, 27th, 28th, and 29th of May.

The hours of Examination will be from nine in the morning to noon; from two to five in the afternoon, and from six to nine in the evening.*

No Candidates will be admitted after the Examinations shall have commenced.

	9 o'clock to 12 o'clock.	2 o'clock to 5 o'clock.	6 o'clock to 9 o'clock.
Whit-Monday, May 24.		Algebra. Magnetism, Electricity and Heat.	Arithmetic.
Whit-Tuesday, May 25.	English History. Navigation and Nautical Astronomy. Practical Mechanics.	Geometry. Physiology.	Book-keeping. Trigonometry. Latin and Roman History.
Wednesday, May 26.	Free-hand Drawing. (From 9 o'clock to 1 o'clock.)		Mechanical Drawing. (From 5 o'clock to 9 o'clock.)
Thursday, May 27.		German. Conic Sections. Agriculture.	French. Political and Social Economy. Chemistry. Mensuration.
Friday, May 28.			Descriptive Geography. Botany. Statics, Dynamics, & Hydrostatics.
Saturday, May 29.			English Literature. Physical Geography, including Geology. Astronomy.

ADVICE TO CANDIDATES.

1. Read over the Time-table carefully, and note the hours appointed for the subjects in which you wish to be examined. Be at your seat in the Examination Room *five minutes before the hour appointed* for each Paper which you are to work.

2. When a Paper is given to you, *first* look at the instructions printed at the head of it, and *then* read the

questions carefully over, marking those which you think you can answer best. Do them first, and if any time remains, you may try some of the others, but do not exceed the number of questions appointed to be answered. Remember that a few accurate and sensible answers will gain a higher number of marks than a great number of indifferent attempts.

3. No Candidate will be allowed to resume the working of a Paper after he has once left the room in the course of the time appointed for that Paper.

4. If a Candidate has any question to ask, or wants anything in the course of the Examination, he should not leave his place; but *should stand up and call out his number*, when some one will attend to him.

5. As soon as notice is given (10 minutes before the end of the time) finish your Papers, see that they are numbered rightly, and in their proper order, and leave them UNFOLDED at your seat.

CAUTION.

6. No Candidate may speak to another Candidate, on any pretence whatever, under pain of immediate expulsion.

7. Any Candidate detected in taking unfair advantages, such as referring to any Book, or Written Paper, or in seeking assistance from another, will be subject to the same penalty.

8. Whoever gives assistance will be treated in the same manner as he who asks for it.

9. Stationery, including Blotting-paper and Drawing-paper, will be furnished for the use of the Candidates. No one can bring anything into the Room with him, except an inkstand and a supply of such pens as he is in the habit of using.

DECLARATION.

Local Board of

We, the undersigned, hereby declare that the a papers on b which are forwarded herewith, were worked, in our presence, by the Candidates whose numbers they respectively bear, without any assistance whatever, from books, notes, memoranda, from each other, or from any other person. We declare that not more than three hours were occupied in working these papers, and that no Candidate was allowed to resume, or complete, his paper after having left the Examination room in the course of the time assigned to that paper; We further declare that the paper of questions given to each Candidate was taken from the envelope in which it was transmitted from the Society of Arts, the seal of this envelope being broken in our presence, and in that of the assembled Candidates, at the commencement of the time appointed for the paper in the time table issued by the Society; and, finally, we declare that not fewer than* of our number were present during the whole time that the Candidates were engaged in these papers.

Name, designation, and address of members of Local Board who were present during the working of the papers referred to in the above declaration.†

(a) Insert Number.

(b) Insert Subject.

* State the number, which in no case must be less than two.

† This declaration must be signed, in every case, by, at least, two of the members of the Local Board; and, when more than twenty Candidates are examined at any one sitting, by, at least, three such members. It must not, in any case, be signed by a member of the Board from whom any of the Candidates have received instruction in the subject of the paper to which it refers.

* Except in case of Free-hand Drawing and Mechanical Drawing. For each of these subjects four hours will be allowed.

BOARD OF EXAMINERS.

The following is a list of the Board of Examiners for the present year :—

Arithmetic { Rev. Alexander Wilson, M.A.,
National Society, London.

Book-keeping { John Ball, Esq., of the firm
of Messrs. Quilter and Ball.

MATHEMATICS.

Algebra { Rev. Harvey Goodwin, M.A.,
Cambridge.

Geometry { Rev. B. Morgan Cowie, M.A.,
Professor of Geometry at
Gresham College; one of
H.M. Inspectors of Schools.

Mensuration { William Spottiswoode, Esq.,
F.R.S.

Trigonometry {

Conic Sections { Rev. Bartholomew Price,
M.A., F.R.S., Sedleian Pro-
fessor of Natural Philosophy
in the University of Oxford.

PHYSICS.

Navigation and Nautical
Astronomy { John Riddle, Esq., F.R.A.S.,
Head Master of the Nauti-
cal Schools, Greenwich.

Statics, Dynamics, Hy-
drostatics { Rev. A. Bath Power, M.A.,
Principal of the Diocesan
Training School, Norwich.

Practical Mechanics { T. M. Goodeve, Esq., Profes-
sor of Natural Philosophy,
King's College, London.

Magnetism, Electricity,
and Heat { Charles Brooke, Esq., M.A.,
F.R.S., Surgeon to the West-
minster Hospital.

Astronomy { Rev. Baden Powell, M.A.,
F.R.S., Savilian Professor of
Geometry in the University
of Oxford.

Chemistry { Dr. A. W. Williamson, Pro-
fessor of Chemistry, Univer-
sity College, London.

Animal Physiology { William Sharpey, Esq., M.D.,
F.R.S., Examiner in Uni-
versity College, London.

Botany { Arthur Henfrey, Esq., F.R.S.,
Professor of Botany, King's
College, London.

Agriculture J. C. Morton, Esq.

Political and Social Eco-
nomy { Charles Neate, Esq., M.A.,
Professor of Political Eco-
nomy in the University of
Oxford.

Descriptive Geography ... Wm. Hughes, Esq., F.R.G.S.

Physical Geography { Rev. Samuel Clark, M.A.,
F.R.G.S., Principal of the
Training College, Battersea.
Chairman of the Board.

English History { E. S. Creasy, Esq., M.A.,
Professor of History, Uni-
versity College, London.

English Literature { Rev. F. Temple, M.A., Head
Master of Rugby School.

Latin and Roman History { F. R. Sandford, Esq., B.A.,
Assistant Secretary to the
Committee of Council on
Education.

French { Alphonse Mariette, Esq.,
M.A., Professor of French,
King's College, London.

German { Dr. Bernays, Professor of
German, King's College,
London.

Freehand Drawing F. S. Cary, Esq.

Mechanical Drawing { Thomas Bradley, Esq., Pro-
fessor of Geometrical Draw-
ing, King's College, London,
and Master at the Royal
Military Academy, Wool-
wich.

TWENTY-SECOND ORDINARY MEETING.

WEDNESDAY, MAY 12, 1858.

The Twenty-Second Ordinary Meeting of the One Hundred and Fourth Session was held on Wednesday, the 12th inst., William Brown, Esq., M.P., Vice-President, in the chair.

The following Candidates were balloted for and duly elected members of the Society :—

Baylis, Charles
Heywood, James

Quain, Richard, M.D.
Watts, William Henry

The CHAIRMAN said we must all feel much indebted to gentlemen who undertook the duty of travelling for the purpose of enlightening those who remained at home, and who, by the publication of their observations and researches, made us acquainted with countries in which we could not but feel the deepest interest, and who gave us an account of the climate, scenery, productions, population, social condition, and, above all, healthfulness and general adaptation for the settlement of European emigrants, of our colonial possessions. In this respect, therefore, we were greatly indebted to Professor Wilson for having undertaken to read a paper on the subject of Canada, which he was sure would be listened to with great interest. He would, therefore, without occupying the time of the meeting further, call upon Professor Wilson to favour them by reading his paper.

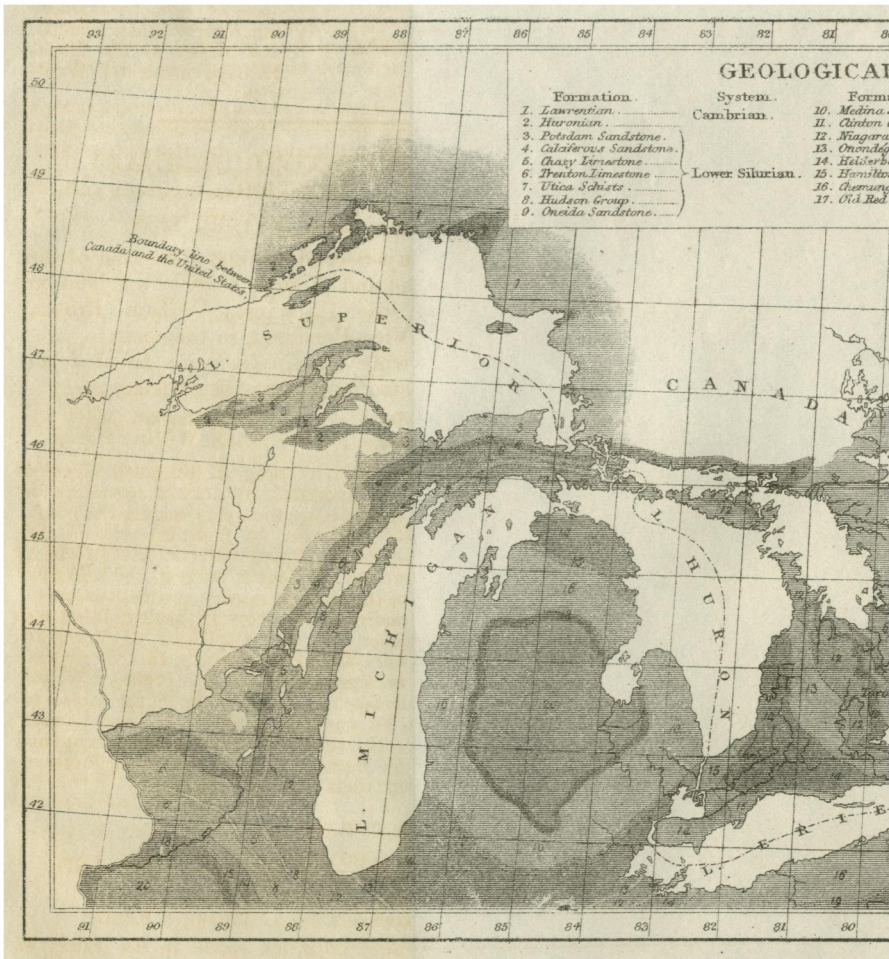
The Paper read was—

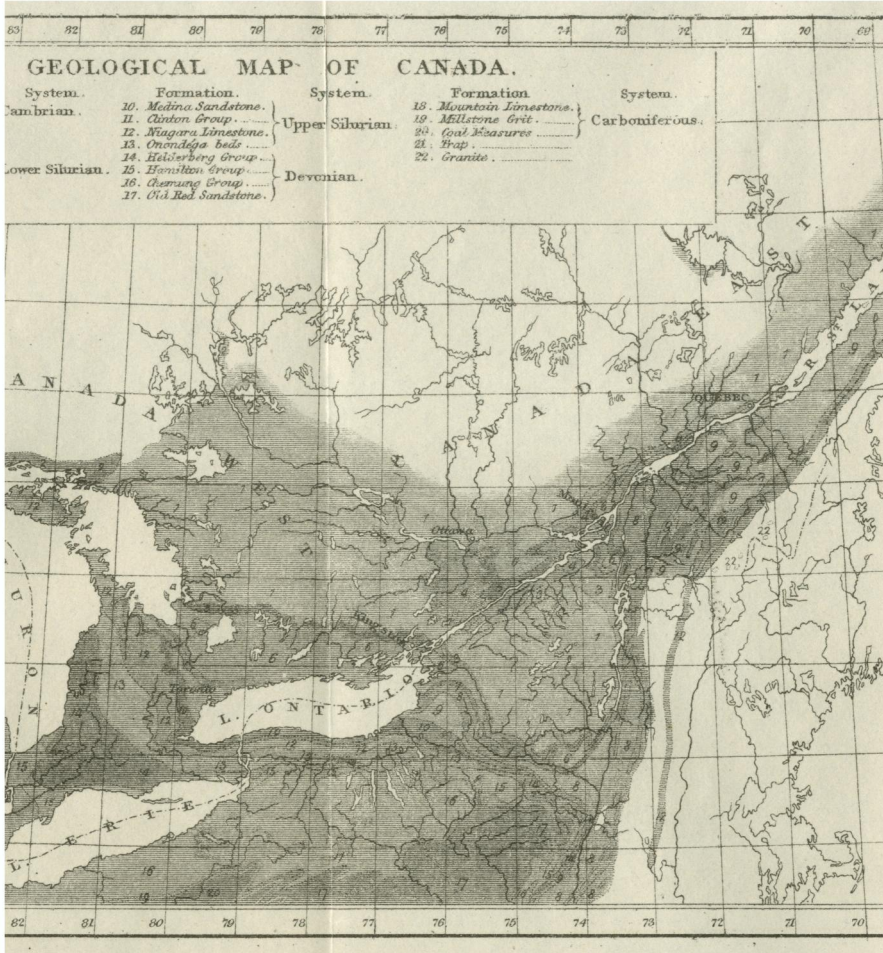
ON CANADA—ITS PRODUCTIONS AND RESOURCES.

By PROFESSOR JOHN WILSON, F.R.S.E.

There are three important epochs in the history of Canada. In the year 1534, Philip Chabot, Vice-Admiral of France, with his able and enterprising lieutenant, Jacques Cartier, sailed into the Gulf of St. Lawrence, and, hoisting his flag on the mainland, took possession of it, in the name of his country.

In 1760, the fierce and bloody struggle, which had been carried on with intermissions and varying success between the North American colonies of France and England for upwards of eighty years, was finally decided upon the heights of Quebec, by that glorious and ever-memorable battle, in which the rival commanders, Wolfe and Montcalm, both fell—the lifeblood of the one ebbing fast as the shouts of victory reached his ears—while the other's spirit had happily passed away, while the victory was yet uncertain, and the pangs of a defeat unknown. From this time the French rule in Canada ceased, for in the following year a formal deed of capitulation ceded to England the right to all her North American possessions;—and New France, as they were termed, ceased, from that time, to be a dependency of the French crown.







In 1851, when Industry received her great ovation in Hyde-park, and all the civilized countries of the world were assembled under one roof—few representative collections excited more gratification, and none more surprise, to the observant visitor, than that which was displayed under the banner of youthful Canada. To many, it is true, it possessed not the attractions of the luxurious though barbarian East—it attempted no rivalry with the high class industry of older countries; the gorgeous gems and highly-wrought minerals of Russia—the magnificent exponents of France's high civilization—the more solid, though still equally advanced, manufactures of Central Europe, were none of them included in her collection. In the place of these luxuries of life, we found its necessities, its stern realities, forming the main object of her display. Some few manufactures, either special to the country, or sufficient to show its progressing condition, were, it is true, exhibited, but the great feature of the collection, that which invested it with such general interest, was the magnificent display of "raw produce," which showed, beyond a doubt, the value and vast industrial resources of a country, whose loss to its former possessor occasioned only the consolatory remark, by the Minister of the day (M. de Choiseul-Stainville), "After all, what signify a few acres of snow in Canada."

The success achieved in Hyde-park, in 1851, was even exceeded in Paris, in 1855, when Canada, an independent and self-exhibiting colony of Great Britain, sustained a successful rivalry with Algeria, the favoured colony of France, varied and admirable though her contributions were, and displayed with all the acknowledged taste and great resources of the Imperial Government. Then it was, in the capital of her ancient mistress, that the contrast between the past and the present state of Canada first most forcibly presented itself, and drew from the lips of Count Jaubert, when examining the magnificent representations of her agriculture, that expression of regret, mingled with admiration, "Now we can indeed form an estimate of the value of those few acres of snow ceded to England with such culpable negligence by the Government of Louis XV." Richly did the collection deserve the encomiums universally bestowed upon it, and Canada stands registered in the memory of France under the descriptive title of "A land of hope, not likely to be disappointed. Active, intelligent, enterprising beyond all other distant nations, which equally abound in the elements of industry and production, she claims and demands our attention."

These opinions, expressed publicly and officially—and I could readily multiply them,—surely carry with them points worthy of our consideration at home—where, I believe, the actual condition of Canada is still very imperfectly known, especially by those classes to whom such knowledge would prove of the greatest benefit; and it is principally with a view to afford this information, that I have been invited to give you this evening my impressions of "Canada: its Productions and Resources,"—impressions formed from personal observation, and from data which, from time to time, have been kindly furnished to me.

To give these in the most succinct manner, I propose to divide them under the following heads: history—geological formation and physical geography—natural productions and capabilities—trade statistics—actual social condition, and general considerations. And I can only attempt to give them in the briefest and most condensed form, as the time allowed me is really insufficient to do full justice to either section of my subject.

The only portion of the history of Canada to which I shall make further allusions, will date from the third epoch—that of 1851—when public attention was first drawn to the condition and capabilities of the colony, by her industrial *début* in Hyde-park, when thousands of

wondering visitors went home and rubbed up their geography anew, in order to be assured of the existence of a country which, under the general name of America, had, by the many, been too generally confounded with the United States. And this portion I can refer to more appropriately when I submit to your consideration the industrial statistics of this progressing country.

GEOLOGY AND PHYSICAL GEOGRAPHY.

That map which hangs on the wall, with its distinctive geological colourings, is, to my mind, most important evidence of the progressing civilization of its country. Thanks to Sir W. E. Logan, the able and indefatigable Director of the Geological Survey of Canada, I have an opportunity not only of showing you how far he has determined the actual geology of the vast country under his charge, but he has also kindly made me acquainted with the results of his preliminary explorations during the past year, which, as they relate more particularly to the surface geology, have a material bearing upon the agricultural capabilities and general settling character of the districts visited. In the ranks of science there are few men whose correctness of observation and judgment and whose opinions are more valued and relied on than those of Sir W. E. Logan.

Prior to the year 1840, Canada was divided into two distinct provinces, known as upper and lower, possessing separate legislative bodies or parliaments for each. In 1840 these provinces were united, although for some purposes the old territorial divisions still exist. The River Ottawa is the division line between the two portions on the north side of the St. Lawrence; and the 45th parallel of latitude on the south side of the river. The entire Province is bound on the north by the British possessions, at present in the hands of the Hudson's Bay Company; on the south and east by the States of the Union, and the British province of North Brunswick. The west boundary, west of Lake Winnipeg, is yet undefined. The great River St. Lawrence and the vast chain of inland lakes—Superior, Huron, Erie, and Ontario—form a wonderful and natural barrier between Canada and the United States, affording at the same time a means of transport and communication of unsurpassed excellence and importance to both.

The area of the Province, without its north-western possessions, is computed at 360,000 square miles; of which about 40,000 only are at present occupied. Its form is that of a parallelogram, stretching south-west and north-east, with an extreme length of about 1,200 miles, by a breadth of 300 miles. The limits of the country extend from the 60th to the 84th degree west long., and from the 42nd to the 52nd deg. parallel of lat.

Throughout the whole of its length the Province is traversed by a mountainous region, dividing it into two basins, which may be distinguished as the north and south basins. This range which has been termed the Lawrentides, form the north shore of the St. Lawrence, from the Gulf as far as Cape Tourment, near Quebec, from which point they leave the river, and while they follow its general direction they withdraw from it, until, near Montreal, we find their course to be at a distance of 10 leagues. In a westerly direction the mountain chain follows the course of the Ottawa river, which it crosses near the Lac des Chats, fifty leagues from Montreal; then, taking a turn to the south, it again comes on to the St. Lawrence near the outlet of Lake Ontario, and from this point trending towards the north-west, the south limit of the formation reaches the south-east extremity of Lake Huron at Matchedash Bay, and forms the east shore of the lake as far as the 47th deg. of lat., where it leaves Lake Huron, and running along Lake Superior it stretches out in a north-west direction as far as the Arctic Ocean.

On the the south bank of the St. Lawrence this formation is seen occupying an area between the Lakes Champlain and Ontario, where it is known as the Adirondack range. With the exception of this locality,

* *La Botanique de l'Exposition de 1855.*

and possibly a small patch or two in Arkansas, and near the head water of the Mississippi, the formation does not occur south of the St. Lawrence, and from the circumstance of its being developed only in the valley of the St. Lawrence, the general name of Lawrentian has been given to the whole system.

The rocks forming this system are almost always sedimentary strata, which have become highly crystalline. They have been much disturbed and form ranges of hills, in which crystalline schists, of a gneissoid and hornblend character, and crystalline limestones, associated with feldspars predominate. The beds of crystalline limestone form important features in this formation. They occur in beds of from a few feet to 300 feet in thickness, and with them various strata of dolomite and of other limestones of a less compact nature and more or less magnesian are found, which aid greatly their disintegration and formation into soils. This system is equivalent to the gneissoid rocks of Scandinavia and Scotland.

The Huronian (our Cambrian) occurs chiefly on the shore-line of Lakes Huron and Superior, and consists of a series of schists, sandstones, limestones, and conglomerates, interstratified with thick beds of greenstone, largely disturbed by the irruption of trap dykes, and resting unconformably upon the Lawrentian beds.

The Silurian system is also largely developed in Canada, covering the inclined strata of the Cambrians of the island on the north side of the Huron, and lying immediately on the Lawrentian throughout the entire range of their outcrop in the valley of the St. Lawrence; indeed, with the exception of a small area of the Devonian system, the whole of the Canadian portion of that great basin, which is bounded to the north by the Lawrentian and Huron rocks, belongs to this system. The lithological characters of these rocks are the same as with us, alternating beds of shales, sandstones, and limestones of variable compactness, the value and character of the soils formed from them being due to the relative proportion and admixtures of the different beds. The Devonian (with the exception of small patches of the Carboniferous) are the highest or most recent formation met with in Canada, and is only met with at the lower end of Lake Ontario, and at the south-east extremity in the district of Gaspé. These beds generally disintegrate readily, and are looked upon as affording evidence of a fertile surface.

The carboniferous system is unhappily limited in Canada to its least valuable representative, the mountain limestone and the millstone grit, and which, indeed, occur only to a very limited extent. We must go beyond the boundary line of the province for those valuable deposits of coal which the neighbouring provinces of Nova Scotia, New Brunswick, and Newfoundland are so abundantly provided with.

Although coals cannot be reckoned in the rich list of her mineral wealth, well nigh every other production of the rocks is to be found among her stores.

Of *Iron Ores* numerous deposits exist. *Hæmatites* at Marmora, Madoc, Sherbrooke, Bedford.

Spathic Ores—Wallace, Lake Huron, McNab, St. Arnaud, Sutton, Brome.

Boy Ores at Middletown, Charlotteville, Eardley, Templeton, Champlain, Portneuf, Standbridge.

Titamiferous Ores—Vaudreuil, St. Urbain.

Zinc Ores at Prince's Mine, Maimansee (Lake Superior).

Lead Ores at Fitzroy, Lansdowne, Ramsay, Bedford, Maimansee, &c.

Copper Ores and Metallic—Lake Superior, Lake Huron, Inverness, Leeds, Upton (argentiferous), Ascot (containing gold and silver).

Nickel—Michipicoten (Lake Superior), Wallace Mine (Lake Huron), Ham, Bolton.

Silver—Lake Superior, Michipicoten, and Prince's Mine.

Gold—Beauce County, auriferous region in alluvial sands, extending over an area of 10,000 square miles

contained also in the ores of Prince's Mine at Ascot and other places.

Uranium—Yellow oxides at Madoc.

Chromium at Bolton and Ham.

Cobalt—Prince's Mine (Lake Superior).

Manganese—Bolton, Stanstead, Beauce, St. Anne.

Barytes—Bathurst, Mc Nab, Lansdown.

Graphite—Grenville, Fitzroy.

Lithograph Stone—Marmora, Rama, Lake Couchicong.

Gypsum—Dumfries, Brantford, Oneida, Seneca, &c.

Phosphate of Lime—Ottawa, Burgess, Calumet, Hull.

Millstones—Bolton, and other places in the eastern townships.

Grindstones and Whetstones—Marmora, Madoc, Stanstead, Bolton, Shepton, Marston.

Building Stones—Granites, sandstones, and limestones, are largely distributed all over the country.

Hydraulic Limestones at Point Douglas, Paris, Cayuga, Thorold, Kingston, Hull, Quebec.

Roofing Slates—Kingsey, Halifax, Melbourne, Riviere du Loup.

Paving Stones—Toronto, York, Bagot, Horton, Inverness.

Clays, suitable for bricks and rough pottery, are found everywhere in the valleys of the St. Lawrence, Ottawa, and Richelieu rivers; for finer goods, at London, Toronto, Coburg, Peterborough.

Marbles, various in colour and pure in quality—white, at Philipsburg; black, at Cornwall; red, at St. Lin; brown, at Pakenham; yellow and black, at Dudswell; grey, &c., at McNab, Montreal, St. Dominique; green, at Grenville, Stukely, Brompton, Oxford.

Peat at Humberstone, Wainsfleet, Goulbourn, and numerous other localities.

Petroleum—on the Thames, River St. Jean, and Ruiseau Argenté (Gaspé).

Asphaltum—Enniskillen.

This slight sketch of the mineral produce of the country, so far as at present explored, is, or ought to be, sufficient to show what immense resources can be offered to industrial enterprise when agriculture has occupied her surface and pioneered the way, and few countries can offer more temptation to the occupier of the soil. Although Canada has been denuded of all those secondary and tertiary formations which give such interest to the geology of our own country, the older rocks, which we are accustomed to associate with ideas of a thin, cheerless, and unfertile surface, have been largely covered up by post-tertiary, the most recent of our terrestrial deposits. Here we have both the chemical and physical elements of fertility, and happily these are spread over extensive areas throughout the Province. The greater portion of the surface of the country is occupied by the inter-stratified clays and sands of these deposits, giving, according to their relative admixtures, every variety of texture, and forming soils of great fertility, especially when in contact with the outcrops of the limestones and feldspars of the subjacent rocks. In this formation those beds of peat are met with, which, in the absence of coals, and with the decreasing supplies of wood, are already becoming of importance to the district in which they occur.

You have only to run your eye over the map of Canada, and you will see the admirable disposition of land and water throughout the entire extent of the country; the magnificent St. Lawrence, the backbone of the system, with its head waters in Lake Superior and its other extremity in the broad Atlantic, 2000 miles off, is the main link in the chain of Canada's present and future prosperity. Along the waters of this grand river, every district of Canada, aye, and of the mighty "West" too, finds a high road to the ocean—there free to take its produce to the markets that pay the best. Its tributaries, some hardly inferior in importance to itself, stretch right and left into regions where the woodman's axe alone breaks the solitude of the primeval forest, and connect the lakes

and rivers of the interior with the ocean—and with those better known to us, on whose shores man has fixed his abode. Look at the Saguenay, with a tidal range of 10 ft. to a distance of 80 miles from its mouth; the St. Maurice, with a length of some 300 miles; the Richelieu—connecting Lake Champlain with the St. Lawrence; the Ottawa, or Grand River—a river destined to occupy an important page in the future of the country—not only as a rival highway for the commerce of the west, but as possessing on its banks the newly-chosen Capital of Canada.

The enormous fresh water lakes or inland seas are too well known to need more than a passing notice. The first we come to, 756 miles from the sea and 234 feet above its level, is Lake Ontario, 180 miles long and 50 miles wide, with a depth of 100 fathoms, and having a surface area of nearly 6,600 square miles. Then comes Lake Erie, 1,041 miles from the sea, and 564 feet above its level, the difference in level being overcome by the Welland canal, one of the finest specimens of canal engineering in the world. Here we have an expanse of water 240 miles long by 54 miles broad, covering an area of nearly 12,000 square miles. Crossing the small Lake St. Clair, 24 miles long by the same in breadth, we reach Lake Huron, 240 miles long by 90 miles broad, with a surface area of about 18,000 square miles, at a distance of 1,350 miles from the sea, and 573 feet above its level. We now approach Lake Superior, the head waters of the St. Lawrence—a short but stupendous canal, constructed by the United States, connecting the two lakes, and completing the chain of navigation for sea-going vessels 2,000 miles into the interior of the country. The vast expanse of water of this lake, the largest in the world, with a length of 333 miles by 160 miles broad, giving a surface area of 32,000 square miles, is at present the end of the St. Lawrence navigation; but a glance at the map will show you that there are chains of rivers and lakes stretching far out into the north-west which some day will play the same part as those already named have done in the advancement of civilisation, and be made subservient to the purposes of man's welfare.

This bountiful distribution of water, and beautifully developed river system, has a broad bearing not only on the general welfare, but upon the very existence of the country. The great and ready powers of transport it affords are as nothing compared with its influence over the climate, the vegetation, and the health of the country. In these we recognise the bounteous provision which gives to the inland portions of the country almost an insular climate, and softens down those extremes of temperature which form such permanent barriers to the occupation of the "mighty West."

The two points most affecting climate and vegetation are temperature and rainfall. Let us see what the meteorological records of Her Majesty's Observatory at Toronto tell us. We have a digest of the range of the thermometer for 11 years, from 1840 to 1850 inclusive:—

	Max.	Min.	Range.	Mean.
January	45.33°	4.41°	49.74°	24.67°
February	46.35	4.37	50.72	24.14
March	53.31	7.59	45.92	30.83
April	71.44	17.96	53.48	42.17
May	76.76	28.82	47.94	51.84
June	76.44	35.72	40.72	61.42
July	88.11	44.05	44.06	66.54
August	83.98	45.02	38.95	65.76
September	80.19	32.07	48.12	57.11
October	66.10	22.17	44.30	44.50
November	57.03	13.38	43.60	36.57
December	45.25	3.52	46.27	27.18

Annual Mean, 44.39°.

These data show us that February is the coldest, and July the hottest, month in the year; that there are four months—December, January, February, and March—when the average temperature is below 32°; there are three months—April, October, and November—during which the temperature remains below the mean temperature of the year; and that there are five months—May, June, July, August, and September—when the temperature is above the annual mean, and which constitute the growing season in Canada.

The average rainfall, calculated from the records of a series of years, gives the following results:—

	Days.	Inches.
January	4.6	1.701
February	3.9	1.088
March	5.7	1.613
April	8.7	2.571
May	10.3	2.975
June	10.7	3.042
July	8.9	3.720
August	9.3	2.719
September	10.6	4.458
October	11.2	2.929
November	9.2	3.026
December	5.1	1.522

Thus showing an average rainfall of 31.364 inches occurring on 97.3 days, and distributed nearly equally over the agricultural year.

To this must be added the average snow-fall, which amounts to 61.9 inches per annum. If we compare the extremes of temperature (taking summer and winter means), between Toronto and the Western States of the Union, we find them entirely in favour of Canada.

	Latitude.		
	Deg.	Min.	Deg.
Canada, at Toronto	43	39	the difference is 39°
Iowa, Muscatine	41	30	45°
Illinois, Fort Armstrong	41	28	49°05
Wisconsin, Fort Crawford	43	03	50°89
Missouri, Council Bluffs	41	45	51°34
Minnesota, Fort Snelling	44	53	56°60

If we compare the temperature and rainfall with those of this country, we find the equally favourable results, our mean temperature being about 50°, and our average rainfall about 28 inches, occurring on 155 days, showing a slight difference in favour of Canada.

As a proof that this excess, so important to vegetation, is not so high as to be injurious to health, the vital statistics of the province, compared with those of other countries, give satisfactory evidence.

In Turkey, the deaths are to the population as 1 in 30

" Prussia	"	"	1	39
" Portugal	"	"	1	40
" Spain	"	"	1	40
" Switzerland	"	"	1	40
" Austria	"	"	1	40
" Norway and Sweden	"	"	1	41
" France	"	"	1	42
" Belgium	"	"	1	43
" Russia (Europe)	"	"	1	44
" Denmark	"	"	1	45
" England	"	"	1	46
" United States	"	"	1	74
" Canada	"	"	1	98
" " (Upper)	"	"	1	102
" " (Lower)	"	"	1	92

These remarks refer chiefly to Canada West, the meteorology of Canada East not having received the same attention. We know, however, that the extremes

of summer and winter temperature are greater in the valleys of the St. Lawrence and Ottawa than south of the 44 deg. parallel; that though the winter is somewhat longer, the air is clear, dry, and bracing. The snow usually comes on at the beginning of December, and disappears about the middle of April, remaining on the ground three or four weeks longer than in the western part of the province. This snow-fall is looked for with great anxiety, especially in the thinly-settled districts, as it furnishes a natural railroad for transport and traffic, which, in a new country, where roads are necessarily few and imperfect, is of great importance. As the country becomes cleared and inhabited, the snowfall gradually diminishes, thus appearing to obey the laws of civilisation, subserving to the wants of the settler in the early days of his necessities, and urging him to other resources as his age advances and his powers increase.

PRODUCTIONS AND GENERAL STATISTICS.

I must content myself with this brief sketch of the geological and physical geography of the country, and now tell you something of its productions, which include within their wide range well nigh all the necessities and most of the comforts of life. These I may divide under three heads: the produce of the Mine—the Forest—and the Field, in each of which the present returns give good evidence of what the future will be when the country is more advanced and its vast resources more developed.

In all new countries, the productions of the surface are of more importance to the settler than those beneath it, and the undue development of its mineral wealth rarely indicates a healthy condition. In Canada, although there is ample evidence of the existence of this wealth, the energies of the people, happily, have been directed to other productions, and this branch of industry remains well-nigh intact for future enterprise. By the trade statistics, we find that the following amounts represent the mineral exports:—1853, £27,339 3s. 2d.; 1854, £74,730 13s. 1d.; 1855, £31,458 15s. 8d.; 1856, £41,411 18s. 8d.; the greater proportion of which is from the Lake Huron copper mines.

The productions of the Forest are more numerous and more important. Of course, timber in its varied shapes is the principal item, potashes and peltry furnishing the other amounts. These returns, which we have from 1851 inclusive, give the following results:—1851, £1,615,878 19s. 6d.; 1852, £1,614,584 14s. 9d.; 1853, £2,355,255 2s. 2d.; 1854, £2,495,341 16s. 10d.; 1855, £1,986,980 16s. 10d.; 1856, £2,504,970 15s. 5d.

The productions of the Field are the true tests of a country's wealth and of its progress. By these we can form the safest estimates of its present as well as future capabilities; and I need not remind you of the vast, the direct, and the increasing importance of the relations between corn-consuming England and her corn-producing colony. The returns here give us evidence of the most satisfactory character.

	1851.	1852.	1853.
	£ s. d.	£ s. d.	£ s. d.
Vegetable Produce...	941,597 18 8	1,157,008 8 4	1,992,811 10 7
Animal Produce	342,631 7 0
Total	2,335,442 17 7
	1854.	1855.	1856.
	£ s. d.	£ s. d.	£ s. d.
Vegetable Produce...	1,882,680 2 8	3,257,599 18 2	3,743,068 17 8
Animal Produce	208,318 4 2	398,796 0 6	641,014 16 11
Total	2,090,998 6 10	3,656,395 18 8	4,384,083 14 7

Another source of wealth exists in Canada, which, up to the present time, has hardly received the attention it

deserves, and which offers a field for almost unlimited enterprise; I mean her fisheries. Along the shores and large rivers a continual harvest might be gathered in, and that too without lessening the productive powers of the field. Unlike the rock embedded minerals, limited in their quantity, and without the powers of increase, and which will bide their time without injury or decrease until the advancing industry of the country calls them from their earthy beds,—the denizens of the water form no item in a country's wealth and no part of its available resources, while they remain within the bosom of their natural world. Every one of these transferred from the water to the shore is as so much added to the wealth of the country.

The following returns show that some attention, however, is being directed to them:—1853, £85,000 13s. 8d.; 1854, £87,427 15s. 6d.; 1855, £114,980 1s. 0d.; 1856, £114,086 13s. 7d.

These tabulated figures represent the surplus wealth in productive industry only. We find, however, that manufacturing industry is sufficiently advanced to pay its tribute to the export trade of the colony. Under the head of manufactures and sundries we see its present condition:—1853, £64,507 5s. 3d.; 1854, £65,406 5s. 1d.; 1855, £136,159 19s. 9d.; 1856, £104,206 14s. 8d.

Under this head, also, we must include the returns of shipbuilding, which, though subject to great variations, is carried on to a considerable extent in the port of Quebec. These show a money value of—1853, £620,187 10s.; 1854, £552,062 10s.; 1855, £304,886 5s.; 1856, £303,269 7s. 6d.

If to these several amounts we add the estimated value of exportations to inland ports, which were as follows:—1853, £447,268 5s. 5d.; 1854, £442,470 3s. 3d.; 1855, £816,253 8s. 4d.; 1856, £559,725 0s. 0d., we arrive at the total value of the exportations of the Colony. —1851, £3,241,180 3s. 9d.; 1852, £3,826,901 15s. 5d.; 1853, £5,950,325 15s. 4d.; 1854, £5,754,797 10s. 9d.; 1855, £7,047,115 5s. 3d.; 1856, £8,011,754 4s. 5d.

When we turn to the home records of the colony, we find evidence of its condition and progress equally satisfactory. In 1851 the gross amount of wheat grown was 16,202,272 bushels, showing an increase of 400 per cent. during the 10 previous years, while, in the United States, the increase had only reached 48 per cent. In oats the produce increased 70 per cent., while that of the States was only 17 per cent. Even in Indian corn Canada compares favourably with the States, her increased production being equal to 163 per cent., while that of the States was only 56 per cent. But perhaps these points would be best understood by comparing them with those of a separate State of the Union, which should be a fair representative of its productive condition. Ohio has been selected for the comparison, and those who know that State will acknowledge that Canada has chosen no mean competitor. The land in Ohio is valued at nearly double that of the average of the Union, and has more than three times as many inhabitants to the square mile, she having 49.55, while the average of the Union is only 15.75. Let us look at some of the principal items. (See the table in the next page.)

These were the statistics of 1851, since then the country has been advancing at even a more rapid rate. In 1851 the gross wheat produce amounted to 16,155,956 bushels, in 1856 to 26,555,684, showing an increase of 10,399,738 bushels, which is equal to 64.3 per cent. in the five years, and raises the return from 8.9 bushels to 10.6 bushels per head of population. In barley and rye the returns are even more satisfactory, the surplus produce of 1855 being 566,534 bushels, while that of 1856 was 989,447, showing an increase of 74.5 per cent. in one year. In Indian corn an increased ratio of increase is seen, the exports of 1855 being 73,066 bushels, those of 1856 being 164,495, the increase amounted to 125 per cent., but even this is exceeded by that of oats, which present an increase of 250 per cent. in one year,

CANADA.	IN OHIO.
Population	1,842,265
Acres occupied, cultivated...	7,800,839
" uncultivated	10,638,957
Total occupied	17,939,796
Acres occupied to each in-	
habitant	9 3 4
Acres of Wheat	1,136,311
Produce in bushels.....	16,155,946
Bushels per acre	14.2
Bushels per inhabitant	8.9
Assessed value of occupied	
Lands	£65,879,048
Oats, produce in bushels	21,434,840
Barley	1,889,499
Rye	869,835
Peas	4,223,487
Cows	591,438
Horses	385,377
Sheep	1,597,849
Cattle	741,106
	1,980,427
	9,851,439
	8,146,000
	17,997,493
	9 0 18
	1,231,437
	14,487,351
	12
	7.3
	£89,689,651
	354,358
	425,718
	55,168
	544,499
	463,397
	3,942,929
	814,448

the quantity exported in 1855 being 370,275 bushels while, in 1856, it amounted to 1,296,677 bushels. The ratio of increase in the productions of the field appears to increase with that of the population; this latter, however, presents some remarkable features.

In 1763, the population of Canada is given at 82,000; 1814, 430,000; 1823, 575,000; 1831, 772,000; 1844, 1,199,000; 1848, 1,491,000; 1851, 1,842,265; 1856, 2,500,000. If we compare these returns with those of the States and also of this country, say for the last decennial census, we can form some idea of the relative population progress of Canada. In Great Britain the increase amounted to 13.2 per cent.; in the United States to 35 per cent., while the population of Canada increased 69 per cent., or if we were to take the western province alone, we should find an increase of no less than 104 per cent. in the ten years. This increased population appears to be the very life blood of the colony. It fills up and consolidates the body of the older settlements, and extends the boundaries of civilisation by spreading out and founding new ones. The returns of surplus produce already quoted, increasing in their ratio with the increase of population, show that the most important element of progress is an increased population. This would naturally follow the course of time, or might be accelerated by immigration, and to this latter mode the government of Canada has very successfully addressed itself. This is a question, too, in which we have a direct interest, whether we view it in its commercial or imperial bearing. We have seen what the colony can supply to our necessities, let us now look at her imports, and see what in return she can consume of our manufactures. The value of the imports into Canada were, in

	£	s.	d.
1841.....	2,694,160	14	6
1850.....	4,245,517	3	6
1851.....	5,358,697	12	7
1852.....	5,071,623	3	11
1853.....	7,995,359	1	1
1854.....	10,132,331	6	9
1855.....	9,021,542	7	3
1856.....	10,896,096	16	2

Thus, while the export trade since 1851 shows an increase of, in round numbers, 150 per cent., the imports have fully doubled themselves in the same period.

* In the tables it must be understood that the money amounts are in the currency of the country, and that about one-half of both the exports and imports are transacted with the United States.

If we take the present productive returns of the cultivated lands as a basis for our calculations, it would be seen that the already occupied land in the colony would support a population of about 10,000,000 inhabitants, and if the present progressive rate of increase is sustained, a writer in "Hunt's Merchants' Magazine" tells us, that at the close of the present century we may expect to see Canada occupied by a population something like 20,000,000 in number. Whatever her numbers may be, it is quite certain that for years to come the great strength of the country will lie in the productions of her soil. With these she will pay for our manufactures; her surplus will supply our wants, and our surplus will administer to her necessities and comforts, and thus the scales of commercial benefit be kept pretty evenly balanced.

SOCIAL CONDITION, &c.

It is quite clear, I think, that there is ample space in Canada for a largely increased population, and it is equally clear, if we may judge from the past, that every increase is followed by a generally increased prosperity. To induce this by means of immigration, the government have lately offered free grants of land along three great arterial lines of road, which have been recently opened up and laid out for settlement. (These you will see marked on the map lying between the Ottawa and Lake Huron.) The grants are not to exceed 100 acres to each, and are offered on the following terms:—

1. That the settler be 18 years of age.
2. That he take possession of the land allotted to him within one month.
3. That he put into cultivation 12 acres of the land in the course of 4 years.
4. That he build a log house 20×18 feet, and reside on the spot until the conditions be fulfilled.

Families may reside on a single lot, and the several members having land allotted to them will be exempt from building and residence on each individual lot.

These lands are generally of very excellent quality, and well-adapted, in respect to soil and climate, to all the purposes of husbandry.

Australia excepted, no country can furnish such singular instances of the rise in the value of surveyed lands as the last five years have witnessed in Canada. The development of the railway system throughout the Province has been the principal agency by which this has been effected. When we recollect that 1852 saw Canada without a single railway, and that 1857 saw her with 1,500 miles completed, and 500 miles more in process of construction, the rise in the value of land is readily understood. The lines of railway must be looked upon as a series of accessible markets for the country they serve. The natural consequence is, that every product of the farm has acquired a certain money value, although before this new access to market it may have been absolutely valueless. The immense remuneration thus obtained for the same outlay of labour has greatly enhanced the value of capital. Land in old settlements, remote from lake ports, has doubled itself in value in five years; while wild lands in new settlements, near to which a railway passes, have trebled their value within a shorter period. These all-powerful means of communication have opened up the country, made available a vast amount of inert wealth, stimulated industry, and effected a complete revolution in farming economy within a range of twenty miles on either side of the course they take.

In all countries similar results have followed the introduction of railways, but in Canada, where lakes having formed the chief means of intercommunication, which were closed to all traffic during the winter months, the results are naturally more felt and more strongly marked. If we turn to the map we see the numerous lines already intersecting the centres of industry and population, while the Great Western Railway, running

from Niagara to Detroit River—some 230 miles—and the Grand Trunk line stretching from Lake Huron in the west, down to Trois Pistoles on the east, connect all these lines with each other, and also with the seaports both of the St. Lawrence and the open Atlantic. This gigantic undertaking, rivalling in its magnificence the great river system of North America, already has 849 miles in traffic operation. Its length, when complete, will be 1,112, and it will stand first among the railways of the world, not only on account of its exceeding length, but more especially for that triumph of engineering skill, which will carry the line of rails across the broad and rapid St. Lawrence, by a tubular bridge, of stupendous proportions, and nearly two miles in length. This (which is to be called the Victoria Bridge) will be complete and open for traffic in 1860; fourteen piers out of the twenty-four are finished, and it is expected that eight or nine of the tubes will be in their places by the end of the current year. The expenditure, so far, has amounted to £712,192, out of £1,260,000, the contract price.

Whatever may be the results of these railways as mere objects of investment, whether at first they are remunerative or not, this much is beyond question, that the extent and nature of the benefits they confer on the districts which they serve cannot be too highly estimated. The railway policy of Canada has been successful, from its boldness and completeness—it has had all the advantages of home experience and home capital; home interests are largely mixed up with its success—and one of the best ways to ensure that, is to make known, far and wide, the advantages it offers to those who are about to seek a new home in the fertile lands of the Western world. I regret that my time will not allow me to give you any details of the admirable arrangements by which the traveller or the emigrant is conveyed for *one payment* from the principal ports of this country, or, indeed, of Europe, to the confines of Canada, and farther still, the extreme boundaries of the United States—Kansas, Nebraska, or Texas; neither can I do more than give a very slight sketch of the great water highway, along which a vessel, sailing from Lake Michigan, finds its way to the broad Atlantic, and, in due time, hands over to the merchant at Liverpool the goods that were shipped at Milwaukee or Chicago. The natural difficulties of the great water roads of the country have submitted to the skill of man, and the canals, both proper and subsidiary, justly rank among the most successful evidences of Canadian enterprise.

The greatly increasing land traffic developed by the railways is urging forward a demand for increased facilities by water, to supplement either their area of service or their carrying powers. Already we find (by last half-yearly Report of the Grand Trunk Railway) a line of screw steamers of large tonnage preparing to run from the Michigan ports to Collingwood—the Northern Railway terminus, on Lake Huron—while at South Quebec, the principal terminus of the Grand Trunk Railway, a very important undertaking, of considerable magnitude, is already in active progress, under the title of the “St. Lawrence Dock and Wharfage Company,” which will go far towards making Quebec the Liverpool of the North American continent. To this point of the river the largest sea-going vessels can come, and now find a safe and commodious harbour, with every arrangement for their traffic purposes; and from this point a daily service of screw steamers of lighter draught will start, and deliver or collect cargoes for them from the river, or lake ports of the interior, while another line will keep Quebec in direct communication with the Lower Provinces on the Gulf. This, too, from the great facilities offered, will probably be the station of departure and arrival of the trans-Atlantic steamers, of which three distinct lines already connect the two countries together. These steamers are thronged even

now with American travellers,* and when the communication with the Western States is fully opened up, we may easily imagine what the effect will be.

So far, I have not touched upon the cities of Canada, and I must still leave them unnoticed, save that one, “Ottawa,” which has quite recently been constituted the Capital of this great country. In former times the seat of government has been by turns in Quebec, Montreal, Kingston, and Toronto. For reasons, which I cannot enter on this evening, it was considered desirable to fix a permanent position for the government, and as each of the cities named put in a claim for that honour and advantage, the Canadian people, through their representatives, wisely resolved to submit the question to the Queen, and accept the Royal decision. This decision was given without favour to any rival claims; a neutral city was chosen, offering great advantages, present as well as future, for the seat of Government, and situated so as largely to partake of all the facilities of communication with the various portions of the country in its charge.

The new capital stands at the mouth of the Rideau River, on the south-west side of the River Ottawa, that great river, second only to the St. Lawrence, which divides the upper province from the lower; the city is at about eighty-seven miles from the confluence of the Ottawa with the St. Lawrence. The river here is about half a mile broad, the two banks being connected by a fine suspension bridge, erected by the Provincial Government. The population is at present about 10,000. The great facilities it offers for manufacturing and commercial industries, owing to its water communications, and immense water powers, combined with the various charms of the newly acquired title of capital, will no doubt rapidly increase its numbers. The scenery round the city is of unsurpassed beauty—wild, romantic, picturesque, and presenting a variety rarely to be met with elsewhere. It is already the centre of the largest “lumbering” district in Canada, and minerals have been successfully worked in the district for some years past.

Between the shores of the Ottawa and Lake Huron lies a territory rich to profusion in mineral wealth, and vast forests which will afford for many years to come the source of profitable employment to the hardy labourer. As fast as the axe of the woodman levels the forest, the plough of the agricultural emigrant will turn up the soil, and rich harvests will be won for the supply of the extensive markets of the old and new worlds. But beyond this tract of timber and mineral lands, through which must shortly flow the waters of the Huron to mingle with those of the Ottawa, lie other lands yet unexplored, and unsubdued to the wants of civilization.

Across the inland sea of the Huron there are the Red River settlements, the very garden of the Hudson's Bay territory, over which monopoly and exclusion have so long thrown a veil of mystery,—but, from which, despite all restriction, there reach us rumours of rich and fertile lands, of abundant harvests, and of exhaustless wealth in the waters, the forests, and the mines. Still westward lies a vast tract of territory, the solitudes of which have been rarely disturbed, save by the trapper or the Indian hunters in pursuit of the wild animals for their furs. Century after century has passed over the regions watered by the noble Saskatchewan; the natural produce of the soil has decayed upon it year after year—the leaves of the dark forests have fallen in hundreds of succeeding autumns, and have enriched the plains to an extent with which even the most highly cultivated lands of old countries can bear no comparison. Nature has given not only a fruitful soil but a genial climate to

* Quebec to Liverpool..... 2,500 miles.
Portland to Liverpool ... 2,750 “
Boston to Liverpool..... 2,790 “
New York to Liverpool: 2,980 “

these regions, and magnificent crops of golden grain of all kinds must reward the industry of those pioneers of civilization, who, at no very distant day will awaken the slumbering echoes of this hitherto sealed land.

That this description is not overdrawn, Mr. Hinde's recent Report* to the Government bears testimony. He tells us that the area of cultivable land of the first quality in the valley of the Red River, and its affluent, the Assiniboine, within British territory exceeds 1,200,000 acres, and that the land adapted for grazing in the same valley exceeds 3,000,000 acres; that all crops cultivated in Canada succeed well, and often show a yield far in excess of Canadian returns; and that the climate, which is a few degrees more extreme than at Toronto, is well adapted for all the operations of husbandry. Sir W. Logan, too, tells us of the favourable geological features of the Ottawa and Lake Huron district, while in the reports of his able assistant, Mr. Murray, we find tracts of hard wood lands, sure indications of agricultural fertility, being met with throughout the entire country.

It is in this region that the government allot the free grants of lands, which certainly offer great natural advantages to the hardy settler.

The report of another of Sir W. Logan's staff, Mr. Richardson, has called public attention to Anticosti, an island in the Gulf at the mouth of the St. Lawrence river. This large island, 135 miles long by 35 to 40 miles in its widest parts, and containing about 1,500,000 acres, is up to the present time totally unoccupied,—its only inhabitants, few in number, being engaged in attending the lighthouses and in hunting pursuits. This state of things will not long remain, as, thanks to the Geological Survey, we now know that the surface of the island is admirably suited to agricultural purposes. "The easily disintegrating character of the rocks forming the subsoil can scarcely fail to have permitted a great admixture of their ruins with whatever drift may have been brought to constitute a soil, and it is reasonable to suppose that the mineral character of these argillaceous limestones must have given to those *débris* a fertile character. It is precisely on such rocks, in such a position, and with such an attitude, that the best soils of the west peninsular of Western Canada, as well as those of the Genesee country, in the State of New York, are placed. I have seen nothing in the actual soil," says Mr. Richardson, "to induce me to suppose that, in so far as soil is concerned, Anticosti will be anything inferior to those regions, and considerations of climate only can induce the opinion that it would be in any way inferior to them in agricultural capabilities. The three months that I was on the island were altogether too short a time to enable me to form any opinion upon the climate of Anticosti. But taking into view the known fact that large bodies of water are more equable in their temperature than large surfaces of land, I should be inclined to suppose that Anticosti would not be so cold in winter, nor hot in summer, as districts that are more inland and more south, and that it would not compare unfavourably with any district between it and Quebec. While the autumn frosts would take effect later at Anticosti, the spring would probably be a little earlier at Quebec. But such is the condition of the island at present, that not a yard of soil has been turned up by a permanent settler, and it is the case that about a million of acres of good land, at the very entrance from the ocean to the province, are left to lie waste, while great expenses are incurred to carry settlers to the most distant parts of the west."

Another important settling country of great prospects, lying between Quebec and the Gulf, has been discovered by Sir W. Logan, the details of which will be given in his next report to the Provincial Government. In a

recent letter he says:—"Last summer one of my exploring parties visited the valley of Lake St. John, on the Saguenay. After passing the gneiss rocks, which give such grandeur to the scenery of the Lower Saguenay, and such a forbidding agricultural aspect to the land for a breadth of 50 miles, this party were very much surprised to find themselves in a valley, which, though 2 deg. north of Quebec, has a climate mild enough to ripen Indian corn and grow excellent wheat, and, in fact, to produce all that is produced between Montreal and Kingston. They went forward into this valley to the westward for 75 miles; it had then a breadth of 50 miles, and the boundaries of it on each side appeared to run on far enough to give 30 miles more in length, so that we may say 5,000 square miles of a good settling country were visible. The soil was generally argillaceous, and the entire valley appeared to be underlaid by lime-feldspar. Settlement is gradually extending into it, and the inhabitants are very prosperous."

Let me now briefly recapitulate the amount of accommodation which Canada offers to new settlers, and you will have a good idea of the enormous resources of the country. Her present population is about 2,500,000, while her lands already occupied are equal to the support of a population of 10 millions. Then we have Anticosti, with its million of fertile acres; the St. John's Lake Valley, where upwards of 3,000,000 acres have already been made known; and, lastly, the important districts lying between the Ottawa and Lake Huron, where government allotments are now being made. Beyond these, the vast territories of the N.W. stretch out their arms wide enough to receive the surplus population of the old world for well-nigh all time to come.

A circular, addressed by the Minister of Agriculture, at the commencement of the present year, to the various municipalities of the province, brought replies from 154 places offering immediate remunerative employment to 15,115 emigrants, either on the farms or in different branches of industry. Great as the advantages offered are to the mere labourer, and important though he be as an element of progress to the Colony, I cannot help thinking that, were the subject liberally entertained by the provincial government, and judiciously handled at home, a higher class emigration might be induced, which, while it would, from its own superior powers, be able to advance itself far more rapidly, and with more certainty, than the lower class, would, from these very circumstances, return a greater and more permanent, as well as a more speedy benefit to the province. This would be drawn from the ranks of the small capitalist—especially the small farmer—the man struggling, more or less hopelessly, against the onward progress of agriculture, without a sufficient knowledge of the principles of his craft, or the capital necessary for its successful prosecution. These deficiencies, fatal obstacles to his future at home in an old country, would disappear in Canada, where the contents of his head and of his purse would at once assume a higher value, and would be invested with the certainty of immediate and increasing returns. He would there find a soil capable of producing every variety of agricultural produce—a climate well suited to English constitutions—a country traversed from one extremity to the other by rivers, roads, railroads, and telegraphs—exhibiting signs of prosperity and comfort everywhere, and in many places even the superfluities and luxuries of older countries. Its admirable School System, unequalled even by that of any State of the Union, would relieve the mind of the settler from one serious consideration, by assuring him of educational advantages far beyond what he has been accustomed to at home. And should he fancy that a Canadian home would leave him ignorant of what was going on in the various parts of the mighty world he had left, his doubts would soon be dispelled by showing him that the public press of Canada already numbers 247 newspapers and periodicals among its productions. Intelligence lags not there on its road, for these, with the un-

* Report of the Canadian Red River Exploring Expedition, dated Feb. 22, 1858.

equalled facilities of the telegraph, speedily broadcast the news of Europe and of their home all over the land.

The motto of Canada is, "Industry, Intelligence, and Integrity," and her emblem is the Beaver. These three qualifications are required by all who desire to make speedy and honourable progress in life, and, when possessed and exercised, they cannot fail, humanly speaking, to command success in Canada. There, there are no monopolies, exclusive privileges, or great and impassable barriers between grades of society, such as exist at home, to check or arrest the progress of the honest and industrious, but poor man. Canada is essentially "a land of hope not to be disappointed," the more especially for labour, whether skilled or unskilled—a land where there is "work and bread for all," and where the certain prospect of prosperity never fails to lessen daily toil and cheer the heart which has the courage to trust in itself, and to believe in its right and power to acquire an honourable position among mankind, with a full share of the blessings and privileges which, under Providence, justly belong to a free and honest life.

DISCUSSION.

The CHAIRMAN asked Professor Wilson whether he could give them any information about a celebrated fish of Lake Superior, "the siskawit," alluded to by Mr. Simmonds, in a paper in the third volume of the Society's *Journal*, page 40. He would read the following passage referring to it:—

"The siskawit, a fish of Lake Superior, is reported to be the fattest fish that swims either in fresh or salt water. The fishermen say that one of these fish, when hung by the tail in the hot sun of a summer's day will melt and entirely disappear except the bones. In packing about fifty barrels last season at Isle Royale, one of the fishermen made two and a half barrels of oil from the heads and leaf fat alone, without the least injury to the marketableness of the fish. Besides this leaf fat the fat or oil is disseminated in a layer of fat and a layer of lean throughout the fish. They are too fat to be eaten fresh, and are put up for market like the Lake white fish and Mackinac trout—celebrated American delicacies."

Mr. P. L. SIMMONDS said that the extract just read formed part of a paper "On some Undeveloped and Unappreciated Articles of Raw Produce from different parts of the World," which he had read before the members at the close of 1854, and for which the Society had done him the honour to award him their silver medal. It was part of a passage in which he was directing public attention to the neglected river and lake fisheries of North America, and it was known as a peculiarity of the fish of the American inland seas that they were very fat.

Before Professor Wilson replied to the Chairman's question, he (Mr. Simmonds) craved permission to make a few remarks on the very excellent paper which had just been read—a paper which, from its valuable statistics and succinct details, was calculated to do much good, not only for the promotion of colonial interests, but also in diffusing sound and authentic information at home. Unfortunately, a great deal of ignorance still prevailed among many classes in the United Kingdom respecting this, our nearest and most important emigration field. Relatively with our other possessions, Canada was making gigantic strides in progress and prosperity. He saw present his friend Sir Cusack Roney, who, from his official position and practical experience, would no doubt be able to afford much valuable recent information connected with emigration and railroad operations. And as respected railways, Professor Wilson had rather understated the number of miles open, there being now 1,653 miles in working operation. It was satisfactory to mark the present condition of Canada and its improving prospects, which were mainly owing to its extensive land and water communications, which had been so fully described. But there were other causes at work. The Americans and the British settlers were now amicably trading together on mutually advantageous terms under the Reciprocity Treaty.

There were now no boundary quarrels, no fishery disputes, no hostile frontier warfare, but a beneficial through traffic was carried on up the St. Lawrence and the lakes to Chicago, and the Western States, and through Portland over the Grand Trunk Line to Canada. But Canada should be viewed not only in its isolated character, but in the relation it was likely to bear, and the influence it would exert in a Federative Union of the British North American Colonies, which would sooner or later take place, even as the union of the Australian Colonies was now being discussed by the several local legislatures. Canada, as had been well remarked, had wisely directed her chief attention to the development of her agricultural resources. These were not only the mainstay, but the sure earnest of success for a young colony. Minerals she had in abundance, the gold of the Chaudiere, the crystalline iron on the islands in Lake Nipissing, the marbles of the Belleville district, the beautiful lithographic stone extending over a tract of seventy miles, from Marmora to Lake Simcoe, the phosphate of lime in the Ottawa valley and elsewhere, and the prolific copper mines on the Canadian shores of Lake Superior, where one mass of virgin copper, weighing 160,000 lbs., had been discovered. But the period had not yet arrived for the due development of these. Labour, capital, and manufacturing works on a large scale were yet deficient. Unlike Australia, where agriculture had given place too much to mining, which partook of a speculative and gambling character, Canada had wisely looked to the products of the farm and the forest, and these furnished the staples of her prosperity. Last year we had imported 115,000 quarters of wheat from British North America. The latest returns of exports given by Professor Wilson (those for 1856), showed that the total value, adding the exports to the inland ports, amounted to about £8,000,000, averaging nearly £4 per head of the population. And the value of the imports, which, for 1856, was given at £11,000,000, was last year still larger. Much of this was, however, taken out by emigrants. Neither could the materials for constructive works, imported from England, be fairly apportioned to the population. Emigration, which had been rather slack for the two previous years, owing to the demands for enlistment during the war, was last year more active, about 21,000 souls having proceeded to the North American colonies, being an increase of between 4,000 and 5,000 over the preceding years. Most of these, as the Chairman was aware, proceeded to Canada, and although some few passed on to the States, yet the largest portion settled in the colony, and there was even an immigration from the States and lower provinces. What Canada was at present they had heard in the course of the paper read, but what she was likely to be in a few years it was difficult to tell. Looking at the extraordinary advances that had been made since 1851, in another five or six years, with improved Atlantic and internal communication—with the probable link of the submarine telegraph across the ocean—and with free grants of land, and the extended territory opened up in the Red River district, and the Ottawa valley, and the Saguenay, we should, probably, find another million added to the population. According to the report of the Commission on Crown Lands, for 1856, the total number of acres of surveyed land unsold remaining in Canada, was 6,732,220, and of unsurveyed, 168,845,455, which, added to private lands undisposed of, made a total in that part of Canada drained by the St. Lawrence and its tributaries, conjectured at 212,019,200 acres. Of this quantity, there were, in Western Canada, 830,398 surveyed, and 57,770,416 unsurveyed, and in Eastern Canada, 4,797,550 surveyed, and 112,075,039 unsurveyed. The direct trade with Canada had a large effect on shipping interests. Professor Wilson had alluded to the shipbuilding of Quebec, but there was a large amount of tonnage locally owned and employed in the Province. In 1856, 2,972 ships, registering 230,000 tons, and 1,143 steamers,

registering 119,506 tons, passed up the St. Lawrence Canals. There were in the Canadian Lakes about 280 vessels, averaging 176 tons, exclusive of small craft, and these ships were valued at half a million sterling. The timber trade with Quebec, as was well known, employed a large amount of tonnage, about 140 vessels, but the general entries of shipping from the British American Colonies last year, amounted to 2,452 ships, aggregating 1,141,476 tons. Of these, the largest number came from the St. Lawrence. When we perceived what strides the various towns and districts of Canada had made, that its colonial revenues were healthy, and its public works on a gigantic scale as compared with other British possessions—when we saw that the import trade of Montreal had doubled itself in the last ten years; and that the provincial authorities were using their utmost exertions to advance the interests of the colony at home and abroad, there could be little doubt that, all things considered, it offered a desirable home for thousands of the handy and industrious population of the United Kingdom, especially the agriculturists and artisans.

Sir CUSACK RONEY said he, in common with all present, had listened with great interest and pleasure to the paper that had been read, which contained a mass of information of the most valuable and truthful character, brought down to the latest period. With regard to the fisheries alluded to, he would state that, in the upper lakes, namely, Lakes Superior, Michigan, Huron, and Erie, very extensive fisheries were carried on. In 1856, there were from 80,000 to 100,000 barrels of fish caught, principally by Americans, and not by Canadians, which fish was salted and cured in the district, and formed a very considerable item of trade there. A very large quantity of the fish of the upper lakes was also used in a fresh state, and Detroit especially, one of the largest towns on the lakes, situated at the foot of the Lake St. Clair, consumed large quantities of it. The fisheries of the lower St. Lawrence, too, thanks to an Act passed in 1856, by the Canadian Legislature, would receive an amount of protection which they had not hitherto had. There had been for many years a vast destruction of the young fish, and great carelessness with regard to them; but now that the Act was passed for the proper protection of the fisheries, there would be an abundant supply of salmon, and by the employment of steam tugs on the St. Lawrence the fish was brought up to Quebec, and from thence it was conveyed by railway to Boston and New York, and other large cities of the United States on the eastern seaboard. The fish fetched very high prices. The Canadian Government, he was happy to say, had of late paid a good deal of attention to the fisheries of the Gulf of St. Lawrence, and had established a system of lighthouses along the coast, and also fishing stations; and he hoped that in the course of a year or two that trade would be largely developed. Professor Wilson had stated that the imports into Canada in 1856 amounted to £10,000,000, whilst the exports in the same year were only of the value of about £8,000,000. Perhaps that might appear a circumstance rather unfavourable to Canada, but the fact was, that the imports of late had been very great in consequence of the construction of railways and other public works going on there. The iron, the locomotives, and almost every description of railway plant, had been imported, and as nearly nine-tenths of the revenues of the Canadian Government consisted of customs duties, those articles, like most others, had had to pay a heavy duty. The consumption of imported articles by the actual consuming population of Canada was below £10,000,000 in the year; but, nevertheless, it was very large, amounting to £3 to £4 per head per annum, showing that almost every person in the colony was in a position to use in abundance those articles which contributed to the revenue of the country. The exports to the United States had increased in a very large measure, in his opinion very much owing to the Reciprocity Treaty, which was brought

about by Lord Elgin in 1854. The development of trade between Canada and the United States had been very great in consequence, but he was sorry to add that the United States Government had recently imposed restrictions upon that trade which were likely to have an injurious effect upon Canada; but the mail which arrived the day previous brought the intelligence that Lord Napier, our ambassador at Washington, had been engaged in conferences on this subject with the American Government, which led to the hope that the restrictions to which he had alluded would either be removed or very considerably modified. In the comparison made by Professor Wilson between the State of Ohio and Canada there was one feature of very considerable importance, as showing the progress which Canada was making in a department of agriculture equally important to that for which the colony had hitherto been chiefly celebrated—viz., its production of wheat. He alluded to the quantity of cattle stock which they were acquiring. Ohio and Canada were in that respect about equal at the present time. In 1856, the number amounted to 900,000 head of cows and of cattle in each. In Ohio a great deal of attention was paid to the improvement of the breeds, and they had imported from this country some of our most valuable stock. It was, therefore, not to be imagined that henceforth Canada would enjoy celebrity as a wheat growing country only. They were paying great attention to other descriptions of agricultural production; and thanks to the influence of agricultural societies, which extended all over the province, and to which the government contributed liberally in the shape of prizes, they were beginning to recognise the value of the rotation of crops and those other improvements which were so important in a country like Canada. The subject of emigration had been alluded to in the paper, and, as that was a matter in which he had had some experience, he would take that opportunity to express a hope that persons unsuited for emigration to any new country would avoid going to Canada. Persons who were seeking employment as accountants, bookkeepers, clerks, and shopmen, in fact, all descriptions of persons accustomed to in-door occupations, were extremely undesirable emigrants, because they could not get employment except at a very unremunerative scale of payment. They could not compete with the native article in the new country. The younger members of families already resident there were taken into those employments, and they could afford to accept a lower rate of remuneration than those who had to support themselves entirely by their own industry. Emigrants from England seeking such employment generally failed to attain their end, and these were the people who sent home accounts discouraging emigration. Such persons had far better stay at home. Canada at present was no place for them; but to those accustomed to out-door occupations, such as farmers with small capital, labourers, and persons accustomed to use their hands and legs, to them profitable employment would be found in Canada at a rate of remuneration that was unknown in this country for that description of labour, and they might all hope to be successful if their conduct was good, and provided they were temperate. If a man were intemperate nothing could save him, for it seemed that intemperance—bad as it was everywhere—was even more destructive to human life in America than it was in this country. With regard to the great public works already executed and still progressing in Canada, he might be allowed to allude to that mighty structure, the Victoria Bridge. It would be the largest engineering work in the world. There were 24 spans with tubular girders, of the character shown in the drawings exhibited on each side of the room. These, with the exception of the centre one, were 240 feet wide. The centre span, which was intended to serve the purposes of navigation, was 330 feet wide, and there would be 60 feet between the water and the under surface of the tube. The piers were bevelled

off for the purpose of allowing the ice to pass away at its breaking up in the spring, which in that country was a formidable occurrence indeed. Within the last four or five weeks, the ice was piled up to a height nearly equal to that of the under surface of the tubular girders, but notwithstanding its unusual accumulation this season, every pier stood as solid as the rock on which it was founded. This was important to notice, inasmuch as some of the fine masonry with which the quays along the river at Montreal were built was greatly damaged and torn up by the violence of the ice. He might mention a circumstance of some importance which had occurred that day, although he could not state it as a certain fact. It had been proposed that the *Leviathan* should run for a period of years in connection with the Grand Trunk Railway of Canada, and this would be the means of carrying out emigrants to that colony and the Western States of America with an amount of comfort and attention to the wants of those persons, such as had never been experienced up to the present time. He believed the whole combination would be one that would be eminently successful. It was a curious coincidence that exactly 10,000 tons of iron were used in the construction of the *Leviathan*, and the same amount of iron would be required for the tubes of the Victoria Bridge. Allusion had been made to the progress of the electric telegraph system in Canada. He only wished that the progress made there would react a little in this country. In Canada a message of ten words, exclusive of the addresses of the sender and receiver, could be sent between Quebec and Montreal, a distance of 180 miles, for 6d., and a halfpenny for every additional word; whilst for the shortest message to Liverpool—200 miles—the charge was 4s. From Quebec to Hamilton, between 400 and 500 miles, the charge for ten words was only 1s. 6d.

Mr. G. F. WILSON, F.R.S., would say one word with reference to the latter portion of the paper, and the commentary of Sir Cusack Roney upon it. He (Mr. Wilson), in common with most other employers of labour, was often consulted by men who had saved a little money in this country, and who wished to benefit themselves and their families by emigration, but who did not see their way to do so. They were dissatisfied with their prospects at home, and they came to him for advice as to where they ought to go to. Up to the present time he had said that he believed Canada to be the right place. But this paper, he thought, gave the whole of the information that was required, and when it was remembered that it would be laid within a few days upon the tables of upwards of three hundred Mechanics' Institutions, and would be read by thousands of working men throughout the country, it was impossible to exaggerate its importance.

The CHAIRMAN said, considering that Canada was one of the finest dependencies of the crown, he thought they could not but feel indebted to Professor Wilson for placing before the public an account of the resources of that country. He was, therefore, sure that they would heartily unite with him in according their thanks to Professor Wilson for his very admirable paper.

The vote of thanks having been passed,

Professor WILSON begged to express his acknowledgments for the honour they had done him. With respect to the fisheries, those he had alluded to were not at the upper part of the St. Lawrence so much as at the lower part, and on the Gulf. He was sure that anyone who was fond of salmon-fishing, and who had read the accounts which he had seen in reference to it, would not think of going to Norway, but would start at once for the St. Lawrence. In the Saguenay and the lower St. Lawrence, he believed the salmon fishing was of the very finest description. A paper on this subject had been written by his friend Dr. Adamson, of Quebec, which afforded valuable information to those who went out upon such an expedition; and there was also a communication by Mr. Nettle, confirming all that Dr. Adamson and

others had written. But there were other fisheries of greater importance than the salmon. In the St. Lawrence—in the lower part of the river—the porpoise fishery was carried on, for the purpose of furnishing oil for the lighthouses, but he believed the extent to which it had been carried on was barely sufficient for the supply required by the contract which had been entered into. In the Exhibition of 1851, a novel feature in the Canadian products was a species of leather prepared from the skin of the porpoise, for which the exhibitor, as an encouragement to pursue the matter, was rewarded with a medal, but he believed very little had been done with reference to it since.

Mr. SIMMONDS stated that it was to some extent an article of commerce in this country, and was used for shoe leather and for other purposes.

Professor WILSON added that he thought it was an article well worth attention. With regard to the salmon fisheries in that district, he was sure they would be carried out to a very large extent. He had tasted salmon in Scotland that had been sent from Vancouver's Island, and it was as fine flavoured as any he had ever eaten. With regard to the exports and imports of Canada, although the imports appeared to exceed the exports by about £2,000,000, yet this must not be considered an unfavourable symptom. He found, comparing the exports of 1856 with those of 1851, there was an increase of 150 per cent., whereas the imports had increased only 100 per cent., and at that rate the exports would soon equal the imports in amount.

A Map of Canada, showing the principal geological features of the country, will be issued with next week's number of the *Journal*.

The Secretary announced that an *Extra Meeting* would be held on Friday next, the 14th inst., when a paper by Mr. T. Baker, "On the Plan Suggested by the Government Commissioners for Disposing of the Metropolitan Sewage," would be read, and that on Wednesday next, the 19th inst., a paper by Mr. Hyde Clarke, "On the English Settlement of the Hill Regions of India," would be read.

MECHANICS' INSTITUTIONS AND MR. BAINES.

At a meeting of the Council of the Institutional Association of Lancashire and Cheshire, held in Manchester on Saturday, 24th April, 1858, it was resolved, on the motion of Mr. Councillor Rumney, and seconded by Isaac Gregory, Esq., F.R.G.S.:—

"That the thanks of the Council of the Institutional Association be presented to Edward Baines, Esq., for his admirable letter addressed to the Editor of the *Times*, entitled 'Are Mechanics' Institutes a failure or a success.'"

"That this Council has no hesitation in assuring Mr. Baines that Mechanics' Institutions in Lancashire and Cheshire have fulfilled the chief objects of their founders, by imparting practical and useful instruction; and, as their representatives, the members of this Council unanimously express their deep obligation for his able and generous advocacy of their cause."

J. W. HUDSON, Ph.D., Chairman.
DAVID MORRIS, Hon. Secretary.

SOUTH KENSINGTON MUSEUM.

During the week ending 8th May, 1858, the visitors have been as follows:—On Monday, Tuesday, and Saturday (free days), 6,872; on Monday and Tuesday

* See present Vol. of *Journal*, p. 358.

(free evenings), 4,825. On the three Students' days (admission to the public 6d.), 386; one Students' evening, Wednesday, 189. Total, 12,272.

Home Correspondence.

MR. SANDERSON'S PAPER ON IRON.

SIR,—In the report of the discussion on the paper read last Wednesday, by Mr. Sanderson, "On the Manufacture of Iron," I am made to say that about seven tons of atmospheric air are blown into the furnace to make a bar of iron, instead of a ton. As the error is almost obvious, I should not have written to request its correction, but Mr. Newton's observations on the remarks I made, which the lateness of the hour caused me to pass without reply at the time, induce me to address you now. I am well acquainted with all the attempts which have been made to economise the waste heat of the gases from the blast furnaces, most of which had been failures, until I had the pleasure, about eleven years ago, to see a plan which effected this object with complete success, carried out at the Iron Works of Ystalyfera, in South Wales.

The method of doing this was contrived by Mr. Budd, the manager. The quantity of solid materials thrown into the furnaces to make one ton of cast-iron was about $5\frac{1}{2}$ tons. These works produced 40 tons per day of very strong metal, and consumed

Mineral, a clay ironstone	100 tons.
Fuel—Anthracite	80 „
Flux—Mountain limestone	30 „

Total 210 tons.

To smelt these solid materials in 24 hours, 20,736,000 cubic feet of air were blown into the furnaces, which, at a mean density of 1.22 ounces to the cubic foot, amounts to 705 tons per day. It was not attempted to ignite the heated vapours from the furnaces by a mixture of atmospheric air, which is sometimes attended with danger, but they were brought down hot from the blast furnaces, and the heat which they brought with them was directly applied to useful purposes. The steam which worked the blast-engine was raised by carrying the heated vapours under and round the boilers, and the saving of coal effected by the economical use of the gases amounted to £3,000 a year.

I subsequently advised the adoption of a similar plan at the Butterley and Codnor Park Iron Works, Derbyshire, where the Butterley Company continue to use it at both the above named works with complete success. But generally speaking those gases are wasted, and those who travel by night through the iron districts of Staffordshire and elsewhere, see the country illuminated by their flames. This is a waste of coal and of money, and as coal is one great cause of England's prosperity, it ought to be better cared for, and its waste avoided.

I am, &c.,

JOSEPH GLYNN.

28, Westbourne-park Villas, London, W.,
May 8th, 1858.

MEETINGS FOR THE ENSUING WEEK.

- MON. Architects, 8.
United Service Inst., 8½. Capt. Blakely, "On a Method of Making Cannon."
TUES. Royal Inst., 3. Mr. J. P. Lacaita, "On the History of Italy during the Middle Ages."
Civil Engineers, 8.
Statistical, 8. Mr. Hendriks, "On Indian Revenues."
Pathological, 8.
WED. Pharmaceutical, 11 a.m. Anniversary.
Society of Arts, 8. Mr. Hyde Clarke, "On the English Settlement of the Hill Regions of India."
Microscopical, 8.
Royal Soc. Lit., 8½.

THURS. Philosophical Club, 5½.

- Antiquaries, 8.
Chemical, 8.
Philological, 8. Anniversary.
Royal, 8½.
FRI. United Service Inst., 3. Lieut.-Col. F. Eardley-Wilmot, "On the Manufacture of Ordnance in the Royal Arsenal, Woolwich."
Royal Inst., 8½. Prof. T. H. Huxley, "On the Phenomena of Gemination."
SAT. Royal Inst., 3. Dr. Lankester, "On the Vegetable Kingdom in its relations to the life of man."
Medical, 8.

PARLIAMENTARY REPORTS.

PRINTED SESSIONAL PAPERS.

- Parl. No. *Delivered on 28th April, 1858.*
57 (2). Savings Banks—Account.
175. Royal Navy—Paper.
212. Army—Return.
219. British Museum—Account and Estimate.
224. Smithfield Market Site—Return.
228. Sutherland Dock Bill—Return.
55. Bills—County Management.
69. ——— Local Management.
62. ——— Chancery Amendment (amended).
63. ——— Church of England Special Services.
64. ——— Stamp Duty on Drafts.
65. ——— Exchequer Bonds (£2,000,000).
Dioceses of Canterbury, London, Winchester, and Rochester—Report of the Commissioners.
Delivered on 29th April, 1858.
180. East India (Retired Officers, &c.)—Return.
196. Woolwich Royal Military Academy—Return.
205. Grand Jury Presentments (Ireland)—Abstract of Accounts.
229. East India (Mutinies)—Copy of a Letter to the Governor-General of India.
Medical Charities (Ireland)—6th Annual Report of the Commissioners.
Delivered on 30th April, 1858:
186. Newspapers—Return.
204. Reformatory Schools—Return (a corrected Copy).
217. Soulages Collection—Return.
232. Model Barracks and Public Offices—Return.
233. Enfield Factory—Return.
239. East India (Railways)—Return.
68. Bill—Masters and Workmen.
Delivered on 1st and 3rd May, 1858.
221. East India (Mutinies)—Copies of Reports and Dispatches.
237. Battersea Park, &c.—Return.
240. Small Arms—Returns.
341. East India (Army)—Return of the Sea Kit.
243. Prideaux's Furnace Valve Door—Return.
201 (8). East India (Revenues, &c.)—Returns.
244. Roads, &c. (Scotland)—Return.
118. Local Acts (32. Durham and Cleveland Union Railway; 33. Ballymena, Ballymoney, Coleraine, and Portrush Junction Railway)—Admiralty Reports.
66. Bills—County Franchise.
70. ——— Poor Law Amendment (amended).
67. ——— Weights and Measures.
71. ——— Oaths (Lords Amendments).
Delivered on 4th May, 1858.
201 (9). East India (Revenues, &c.)—Return of the Number of Officers on the Retired List, &c.
201 (10). East India (Revenues, &c.)—Statement of Sums Subscribed to each of the Public Loans, &c.
225. Mercantile Marine Fund—Account.
226. Merchant Seamen's Fund—Account.
231. Exhibition of 1851—Accounts.
234. Examinations (Army)—Return of Names of Successful Candidates.
248. Enrolled Pensioners, &c.—Return.
249. East India (Bodell's Traction Engine)—Return.
58. Bill—Universities (Scotland).
Delivered on 5th May, 1858.
162. Civil Service Estimates—Classes 1-6.
251. East India (Civil Service)—Regulations for Examination of Candidates.
118. Local Acts (34. Stockton and Darlington Railway (North Riding Lines)—Admiralty Report.
54. Bills—Patent Law Amendment.
69. ——— Medical Profession and Medical Corporations.
Delivered on 6th May, 1858.
208. Poor Rates, &c. (Metropolitan Districts)—Return.
238. Metropolis Turnpike Roads—33rd Report of the Commissioners.
247. County Treasurers (Ireland)—Account.
Delivered on 7th May, 1858.
98 (A II.) Poor Rates and Pauperism—Return (A).
168. Increase and Diminution (Public Offices)—Abstract of Accounts.
169. Superannuations (Public Offices)—Accounts.
255. South Kensington Museum, &c.—Returns.
257. Navy (Continuance Service Men)—Return.
74. Bills—Non-Parochial Registers.

